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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,665	08/05/2005	Shigeo Shirakura	Q85162	1909
23373 7590 12/23/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
EXAMINER WEISZ, DAVID G				
ART UNIT		PAPER NUMBER		
1797				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/517,665

**Applicant(s)**

SHIRAKURA, SHIGEO

**Examiner**

DAVID WEISZ

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SE/IB)
- Paper No(s)/Mail Date 20041213;20050112;20060330;20080124
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date: \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_



## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 3 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 3 and 7 disclose the variable "evaluation mole ratio" in the equations of the claims. The arbitrary value is not sufficiently described to enable one of ordinary skill in the art at the time of the invention to utilize the equation of claims 3 and 7 to determine the removal of %NO<sub>x</sub> in the disclosed apparatus or method. What is the evaluation mole ratio?

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

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3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-2, 4-6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keizo et al. (JP747108B2) in view of Yoshimichi et al. (JP1010901A).
6. Regarding claim 1, Keizo discloses an NO<sub>x</sub> removal catalyst management unit for use with an NO<sub>x</sub> removal apparatus [0001]. The management unit is provided for managing a plurality of NO<sub>x</sub> removal catalyst layers provided in a flue gas NO<sub>x</sub> removal apparatus [0005]. The management unit comprises NO<sub>x</sub> measurement means for determining NO<sub>x</sub> concentrations on the inlet and outlet sides of respective NO<sub>x</sub> removal catalyst layers [0005]. The management unit also includes NH<sub>3</sub> measurement means for determining NH<sub>3</sub> concentrations on the inlet and outlet sides of the same NO<sub>x</sub> removal catalyst layers [0005]. However, Keizo does not disclose that the percent NO<sub>x</sub> removal determination means for determining percent NO<sub>x</sub> removal is on the basis of an inlet mole ratio (i.e., inlet NH<sub>3</sub>/inlet NO<sub>x</sub>), the inlet mole ratio being derived from an NO<sub>x</sub> concentration which is an NO<sub>x</sub> concentration as measured on the inlet side by means of said NO<sub>x</sub> measurement means and an NH<sub>3</sub> concentration which is an NH<sub>3</sub> concentration as measured on the inlet side by means of said NH<sub>3</sub> measurement means.

Yoshimichi discloses an NO<sub>x</sub> catalyst management unit [0001] in which a NO<sub>x</sub> removal means for determining percent NO<sub>x</sub> removal uses the basis of an inlet mole ratio (i.e., inlet NH<sub>3</sub>/inlet NO<sub>x</sub>) [0009], the inlet mole ratio being

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derived from an NO<sub>x</sub> concentration which is an NO<sub>x</sub> concentration as measured on the inlet side by means of said NO<sub>x</sub> measurement means and an NH<sub>3</sub> concentration which is an NH<sub>3</sub> concentration as measured on the inlet side by means of said NH<sub>3</sub> measurement means **[0011]**. Additionally, Yoshimichi discloses that using the inlet mole ratio allows exhaust gas calculations to be calculated using a predetermined function **[0012]**.

Keizo and Yoshimichi are analogous because both references are directed towards using NH<sub>3</sub> concentrations to determine NO<sub>x</sub> removal in a catalyst.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the mole ratio disclosed by Yoshimichi in the NO<sub>x</sub> catalyst management unit of Keizo because having a predetermined function would allow for NO<sub>x</sub> removal efficiency calculation.

Regarding claim 2, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the NO<sub>x</sub> removal catalyst management unit for use with an NO<sub>x</sub> removal apparatus, wherein the percent NO<sub>x</sub> removal is determined on the basis of NH<sub>3</sub> concentrations (**Yoshimichi [0012]**).

Regarding claim 4, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the NO<sub>x</sub> removal catalyst management unit for use with an NO<sub>x</sub> removal apparatus, which management unit further includes transmission means for transmitting concentration values (**Yoshimichi [0017-0018]**) determined by the NO<sub>x</sub> measurement means and the

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NH<sub>3</sub> measurement means to the percent NO<sub>x</sub> removal determination means **(Keizo [0005])**, wherein the percent NO<sub>x</sub> removal determination means determines the percent NO<sub>x</sub> removal of respective NO<sub>x</sub> removal catalyst layers included in a plurality of flue gas NO<sub>x</sub> removal apparatuses **(Keizo [0005])**.

Regarding claim 5, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses a method for managing an NO<sub>x</sub> removal catalyst for use with an NO<sub>x</sub> removal apparatus **(Keizo [0001])**, the method being provided for managing a plurality of NO<sub>x</sub> removal catalyst layers provided in a flue gas NO<sub>x</sub> removal apparatus **(Keizo [0005])**, characterized in that the method comprises determining NO<sub>x</sub> concentrations and NH<sub>3</sub> concentrations on the inlet and outlet sides of respective NO<sub>x</sub> removal catalyst layers **(Keizo [0005])**; determining percent NO<sub>x</sub> removal on the basis of an inlet mole ratio (i.e., inlet NH<sub>3</sub>/inlet NO<sub>x</sub>) **(Yoshimichi [0009])**; and evaluating performance of respective NO<sub>x</sub> removal catalyst layers on the basis of the percent NO<sub>x</sub> removal **(Keizo [0005])**, the inlet mole ratio being derived from an NO<sub>x</sub> concentration which is an NO<sub>x</sub> concentration as measured on the inlet side and an NH<sub>3</sub> concentration which is an NH<sub>3</sub> concentration as measured on the inlet side **(Yoshimichi [0009])**.

Regarding claim 6, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the method for managing an NO<sub>x</sub> removal catalyst for use with an NO<sub>x</sub> removal apparatus, wherein the percent NO<sub>x</sub> removal is determined on the basis of NH<sub>3</sub> concentrations **(Yoshimichi [0012])**.

Regarding claim 10, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the method for managing an NOx removal catalyst for use with an NOx removal apparatus, wherein the method further comprises determining the percent NOx removal of respective NOx removal catalyst layers included in a plurality of flue gas NOx removal apparatuses (**Keizo [0005]**) and evaluating catalytic performance of respective NOx removal catalyst layers included in a plurality of flue gas NOx removal apparatuses (**Keizo [0005]**).

7. Claims 8-9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keizo et al. (JP747108B2) in view of Yoshimichi et al. (JP1010901A) as applied to claims 1-2, 4-6 and 10 above, and further in view of Ganeshan (US 2002/0127153).

Regarding claim 8, modified Keizo discloses all of the claim limitations as set forth above. However, the reference does not disclose that the method further comprises performing restoration treatment of an NOx removal catalyst layer having a catalytic performance deteriorated to a predetermined level, on the basis of results of performance evaluation of the respective NOx removal catalyst layers.

Ganeshan discloses a method for managing an NOx removal catalyst for use with an NOx removal apparatus **[0008-0010]**, including performing restoration treatment of an NOx removal catalyst layer having a catalytic performance deteriorated to a predetermined level. The restoration is performed on the basis of results of performance evaluation of the respective NOx removal

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catalyst layers **[0020]**. Additionally, Ganeshan discloses that replacing the catalyst uses conventional methodology and equipment **[0020]**.

Ganeshan and modified Keizo are analogous because all references are directed toward selective catalytic reduction units and the management of NO<sub>x</sub>.

It would have been obvious to one having ordinary skill in the art at the time of the invention to use the catalyst layer restoration treatment of Ganeshan in the method of managing an NO<sub>x</sub> removal catalyst for use with an NO<sub>x</sub> removal apparatus of modified Keizo because it is conventional to replace the catalyst when it does not sufficiently reduce NO<sub>x</sub>.

Regarding claim 9, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the method for managing an NO<sub>x</sub> removal catalyst for use with an NO<sub>x</sub> removal apparatus, wherein the performance restoration treatment is replacement of the NO<sub>x</sub> removal catalyst layer with a new NO<sub>x</sub> removal catalyst layer (**Ganeshan [0020]**).

Regarding claims 11 and 12, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the method for managing an NO<sub>x</sub> removal catalyst for use with an NO<sub>x</sub> removal apparatus, wherein the method further comprises determining the percent NO<sub>x</sub> removal of respective NO<sub>x</sub> removal catalyst layers included in a plurality of flue gas NO<sub>x</sub> removal apparatuses (**Keizo [0005]**) and evaluating catalytic performance of respective NO<sub>x</sub> removal catalyst layers included in a plurality of flue gas NO<sub>x</sub> removal apparatuses (**Keizo [0005]**).

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID WEISZ whose telephone number is (571)270-7073. The examiner can normally be reached on Monday - Thursday, 7:30 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. W./  
Examiner, Art Unit 1797

/Jill Warden/  
Supervisory Patent Examiner, Art Unit 1797